FY 2000 Subsistence Fisheries Project Narrative
Project # 44

Project Title: Falls Lake Sockeye Salmon Stock Assessment (ADF&G stream number 109-20-013).

Investigator Organization(s): Alaska Department of Fish and Game
Geographic Area: Southeast Alaska
Information Type: Stock Status/Trends

Issue Addressed: The adequacy of the annual terminal abundance of sockeye salmon for meeting escapement and subsistence needs has been raised by State and Federal resource managers, the Regional Advisory Council, and the Organized Village of Kake. Subsistence users are concerned about the sustainability of subsistence harvests of Falls Lake sockeye salmon. There has been a recent increase in subsistence harvests and there is no in- or post-season program in place for estimating and managing for escapements needed to sustain subsistence harvest levels.

Objectives:

1. Obtain accurate daily counts of the number of adult sockeye and coho salmon entering Falls Lake to spawn as they are passed above a weir.
2. Estimate the escapement of sockeye and coho salmon into Falls Lake such that the estimates are within 10% of the actual abundance 95% of the time.
3. Estimate the age, length, and sex composition of the sockeye and coho salmon in the Falls Lake escapement such that these estimates are within 5%, 95% of the time.
4. Estimate a conversion between in-lake survey / mark-recapture estimates, impedance tunnel counts on the existing fish way, and the total estimated escapement of sockeye salmon such that the estimates have a coefficient of variation less than 20%
5. Estimate the in-lake productivity of Falls Lake using established ADFG limnological sampling procedures
6. Estimate the sockeye fry rearing density within Falls Lake such that the estimate is within 10%, 90% of the time.

Project Description:

Background: Falls Lake is a 94.9-hectare (235 acre) lake located on the East Side of Baranof Island (56° 49' 30" N, 134° 42' 00" W) just south of the entrance to Red Bluff Bay. The short outlet stream, Falls Lake Creek, cascades directly into Chatham Strait. Falls Lake sockeye salmon are an important subsistence resource for residents of the villages of Angoon and Kake and the City of Sitka. The system has a relatively small run of sockeye salmon. Between 1985, when ADF&G began maintaining subsistence harvest records, and 1999 there has been a significant increase in reported effort and harvest. Sockeye harvests have climbed from 17 to 938+ and permits from 2 to 68 over this period. For 1999, the possession limit was 10 sockeye and the season was June 1-July 20. There is concern that harvest may be under-reported. The percent of reported harvest by gear type was 47% beach seine, 35% gillnet, 13% unknown, 4% dip net, and 1% other. Of the total sockeye harvested, Kake residents took 91%, Sitka residents took 5% and "other communities" harvested 4%.

There have not been any directed studies to estimate sockeye escapements into Falls Lake since a cooperative ADF&G/USFS lake enrichment/fish pass project was conducted from 1981-1989. A weir was operated to estimate escapements of coho salmon from 1981-1989 and to estimate escapements of sockeye from 1981-1985 and 1987-1989. Sockeye escapement estimates ranged from 1,289 to 6,143 in these years and coho escapements ranged from 1 to 188. Subsistence harvest and escapement estimates overlapped in the 1985 to 1989 weir years. Harvests were up to 25% of the terminal run size then when reported subsistence harvests were around 300 fish. Recently increasing levels of subsistence harvest (an average of 937 reported on permits over the past 6 years, indicate harvest rates of 37-77% of returns are possible considering an average weir count of 2,500/year and a low weir count of 1,225. Potential incomplete reporting on subsistence permits and lack of enforcement further confounds the issue. Because of these concerns the ADF&G restricted access to the stock in 1999 by limitation of the open season on the permit. Biologists from ADF&G and the USFS are concerned about the sustainability of harvests for the Falls Lake sockeye salmon stock because there is no in season assessment program. Village subsistence users share that conservation concern.

This project supports collection and analysis of the basic stock assessment data needed to manage for escapement and subsistence needs. Field studies are planned for a 5-year period; however, funding this proposal will provide only three years of data collection. Future funding requests to complete the remaining two years of the study are anticipated. This stock assessment evaluation is designed to encompass the factors effecting the current harvest activities of subsistence fishermen, the existing salmon productivity of the lake and the potential productivity of the lake. Effective management of this important subsistence stock requires quantifiable escapement goals and the ability to regulate harvest opportunities to ensure that escapements are within goal ranges and adequately distributed through time.

Objectives 1, 2,3, and 4: A weir will be operated on the outlet of Falls Lake to count the daily number of sockeye, coho, and other salmon entering the lake. The annual escapement of sockeye and coho salmon will be estimated from the weir count or a backup mark-recapture census if fish were estimated to have entered the lake uncounted.
All sockeye enumerated at the weir will be adipose fin-clipped for recapture assessment on the spawning grounds. Marking fraction may be reduced slightly during periods of high fish volume but all unmarked fish will also be enumerated. Age, weight, length, and sex sampling will also occur daily from a representative sample to assess size and age at return for calculating brood survivals. A recapture of marked fish will be initiated at the mouth of the three spawning streams in mid-August. Beach seining will occur once a week to capture live sockeye holding in these areas prior to spawning. Additional seining may occur near areas where beach spawning occurs. This mark-recapture program will produce a Peterson estimate of total escapement and assess how many fish enter the system uncounted. In addition, a pre-planned series of four or five foot escapement surveys will occur on the spawning grounds to enumerate spawning salmon. These surveys will be spaced approximately 7 to 10 days apart to cover the expected spawning time.

Objective 5: Four limnological surveys will be performed during the period May through October at two stations on Falls Lake. Final analysis of these samples will be performed by the ADF&G, Commercial Fisheries Limnology Lab in Soldotna, Alaska by methods described in Koenings et al. 1987. Evaluation and consultation of this sub-project will also include limnological modeling to examine the potential carrying capacity of Falls Lake using the ZB-EZD model (Zadina and Weller, 1999) and a comparison with current rearing populations.

Objective 6: One annual survey to assess the fall rearing population of sockeye salmon in Falls Lake will be made between August and October using hydroacoustics and mid-water trawling. Standard methods used by ADF&G since 1985 will be employed.

Consultations Completed/Potential for Capacity Development: Completed and conducting ongoing consultations with ADF&G, Organized Village of Kake, Southeast Native Subsistence Commission, Southeast Regional Advisory Council, and Sitka Tribe of Alaska. Organized Village of Kake will be involved with this project by providing two technicians to staff the weir and assist with limnological investigations.

Deliverables/Products:

1. Annual Progress Report (in textual and electronic format) describing project accomplishments and results for the year. This report will provide estimates of the on-site harvests and of the total escapement of sockeye and coho salmon to Falls Lake.
2. Electronic access to summarized project data, including: daily weir counts by species, salmon age, sex, size data, and mark-recapture results.

Estimated Costs.

Year	Non-agency	Federal Agency	Federal Local Hire	State Agency	State Local Hire	Total
2000		$6,000	$9,000	$118,000		$133,000
2001			$31,000	$109,000		$140,000
2002			$31,000	$109,000		$140,000
Total		$6,000	$71,000	$336,000		$413,000